THE INVENTION CLAIMED IS

1. In a method for the vapor deposition of thin single layer or multilayer films on a substrate, the improvement comprising:

positioning a dynamic mask adjacent said substrate to block a portion of deposition material directed toward said substrate, and

moving said mask relative to said substrate.

2. The improvement of Claim 1, wherein moving said mask is carried out under control of a computer.

3. The improvement of Claim 1, wherein moving said mask is carried out to enable one or more of linear or rotational movement of said mask.

4. The improvement of Claim 1, wherein said dynamic mask is selected from the group consisting of a solid mask, and a mask with a shaped hole therein.

5. The improvement of Claim 4, wherein said shaped hole in said dynamic mask is selected from the group consisting of circular, rectangular, and complex shapes optimized for uniformity and deposition rate.

6. The improvement of Claim 1, wherein moving said mask is carried out to enable movement of said mask relative to said substrate selected from at least one of linear movement, rotational movement, single pass, multiple pass, partial pass, and complete pass.

7. The improvement of Claim 2, wherein said computer is constructed to control acceleration, velocity, and position of said dynamic mask to enable deposition of a precisely tailored film thickness distribution.

8. The improvement of Claim 2, additionally including providing the computer with software capable of moving said dynamic mask so as to form a film on said substrate from the group consisting of uniform thickness films and graded thickness films.

9. The method of Claim 1 wherein the vapor deposition of thin films on a substrate is carried out by using a deposition source selected from the group consisting of ion beam sputter source, electron-beam evaporation sources, ion-assisted ion beam sputter sources, and ion-assisted electron-beam evaporation sources, and wherein said dynamic mask is moved so to produce a precisely tailored film with either uniform thickness or graded thickness.

10. The method of Claim 9, wherein the film is produced to have a uniform thickness to about 0.1% across the substrate.

11. In a vapor deposition apparatus, the improvement comprising:

a movable mask mounted in front of a substrate to be coated with a film of selected material,

said movable mask being selected from a group of masks consisting of solid masks and masks having a shaped hole therein through which deposition material passes to the substrate, and

means for moving said movable mask relative to said substrate being controlled by a computer.

12. The improvement of Claim 11, additionally including software for said computer to cause motion of said movable mask to allow deposition

material to form a film on the substrate selected from one of uniform thickness and graded thickness.

13. The improvement of Claim 11, wherein said movable mask has a shaped hole therein, and wherein said shaped hole is configured to optimize uniformity and deposition rate.

14. The improvement of Claim 11, wherein said movable mask is controlled by software in said computer to move in a linear motion or a rotational motion.

15. The improvement of Claim 11, wherein said movable mask is controlled by software in said computer to make single or multiple passes in front of said substrate per layer of material deposited on said substrate.

16. The improvement of Claim 11, wherein said computer includes software which controls the velocity and position of said movable mask to precisely tailor film thickness distribution.

17. The vapor deposition apparatus of Claim 11, selected from the group consisting of ion beam sputtered sources and electron-beam evaporation sources.

18. The vapor deposition apparatus of Claim 17, additionally including an ion source producing an ion beam directed at said substrate.

19. A method for producing single layer or multilayer films with high thickness uniformity or custom thickness gradients, comprising:

providing a vapor deposition source,

providing a substrate in spaced relation to said source,

providing a computer controlled dynamic mask in front of the substrate to block an amount of flux from the source before it deposits on the substrate, and

controlling velocity and position of the dynamic mask by the computer to precisely tailor the film thickness distribution.

20. The method of Claim 19, additionally forming the vapor deposition source from a deposition system selected from the group consisting of ion beam sputter systems, electron-beam evaporation systems, and ion beam assisted sputter or evaporation systems.